

REMARKS

Claims 1 – 15 and 17 – 23 are now pending in the application. Claim 16 has been cancelled. Minor amendments have been made to the claims to simply overcome the rejections of the claims under 35 U.S.C. § 112. The amendments to the claims contained herein are of equivalent scope as originally filed and, thus, are not a narrowing amendment. The Examiner is respectfully requested to reconsider and withdraw the rejection(s) in view of the amendments and remarks contained herein.

DRAWINGS

The drawings stand objected to for certain informalities. Applicant has attached revised drawings for the Examiner's approval. In the "Replacement Sheet" reference "T2" has been added to Figure 1.

REJECTION UNDER 35 U.S.C. § 112

Claim 18 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point and distinctly claim the subject matter which Applicants regard as the invention. Applicants note that claim 18 has been amended to read "the plurality of workpieces". Furthermore, the phrase "of the 70%" has been amended to read "the 70%" according to the Examiner's instruction.

REJECTION UNDER 35 U.S.C. § 102

Claims 1 – 6, 8 – 9, 13, 14 – 18, and 19 – 22 stand rejected under 35 U.S.C. § 102(e(1)) as being anticipated by U.S. Pat. No. 6,385,843 (Singh). This rejection is respectfully traversed.

At the outset Applicants note that independent claims 1 and 9 have been amended to recite wherein the shank has an outer diameter and a substantially flat ring-shaped end surface with a radial length defined substantially perpendicular to the shank outer diameter. Additionally, independent claim 14 has been amended to recite a flange defining an outer cylindrical wall having an axial length and wherein the axial length of the flange is about 30 – 40% of the outer radius of the shank. Furthermore, independent claim 19 has been amended to recite the cavity defining a conical tapered section having a linear cross-section and defining an angle between about 70° and about 110°.

Singh at best discloses a rivet having a top 5, a shank 6 and cavity 8. The cavity 8 is in the form of a cone 9. The sides 10 of the cone are preferably slightly convex. A “sharp edge” is virtually created. During stamping the rivet can penetrate a top metal sheet 1 by way of this edge. See e.g. Col. 2, Lines 23 – 30.

The rivet of the present invention as captured in amended claims 1 and 9 is distinct. Specifically, the claimed rivet of the present invention recites wherein the shank has an outer diameter and a substantially flat ring-shaped end surface with a radial length defined substantially perpendicular to the shank outer diameter. Singh does not anticipate, teach or suggest such a feature. Alternatively, Singh discloses a shank defining a “sharp edge” or point at an interface between the cone and outer

diameter of the shank. Therefore, Applicants respectfully submit that independent claims 1 and 9 and claims 2 – 8 and 10 – 13 which are respectively dependant therefrom, are now in condition for allowance.

The rivet of the present invention, as provided in amended claim 14, provides a flange having an outer cylindrical wall having an axial length. See e.g. L1, FIG. 1. Furthermore, amended claim 14 recites wherein the axial length of the flange is about 30 – 40% of the outer radius of the shank. Applicants respectfully assert that the flange of Singh does not include an outer cylindrical wall having an axial length about 30 – 40% of the outer radius of the shank. The flange of Singh defines an outwardly directed radius R1 defined from the rivet head top 5 to the shank 6 (FIG. 1). Therefore, Applicants respectfully submit that independent claim 14 and claims 15, 17 and 18 which are dependant therefrom, are now in condition for allowance.

As provided in amended claim 19, the present invention provides a self-piercing fastener having a cylindrical shank body defining a hollow cavity, the cavity defining a conical tapered section having a linear cross-section and defining an angle between about 70° and about 110°. The cone 9 of Singh includes walls 10 having a convex contour. See e.g. FIG. 1 and Col. 2, Line 25. Furthermore, Applicants assert that the rivet of Singh incorporates the convex contour to facilitate the “sharp edge” for facilitating penetration of the rivet into a workpiece. Applicants maintain that the conical tapered section along with the flat ring-shaped end of the present invention facilitate piercing of the fastener. Therefore, Applicants respectfully submit that independent claim 19 and claims 20 – 23 which are dependant therefrom, are now in condition for allowance.

Applicants note that claim 3 has been amended to be consistent with the specification. Specifically, claim 3 has been amended to recite wherein the flange defines a cylindrical outer wall having an axial length 15 – 20% of the outer diameter of the shank. In addition, claim 6 has been amended to recite wherein the radial length of the substantially flat ring-shaped end surface of the shank is between 3 and 10% of the outer diameter of the shank. Claim 21 has been amended to recite wherein the shank has an outer diameter and a substantially flat ring-shaped end surface adjacent the conical tapered section, the flat ring-shaped end surface having a radial length defined substantially perpendicular to the shank outer diameter.

REJECTION UNDER 35 U.S.C. § 103

Claim 7 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Pat. App. No. 2001/0006321 (Singh 2001) in view of NPL, eFunda.com (printout 1). Claims 10 and 11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Singh in view of NPL, arrowfastener.com (printout 2). Claim 12 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Singh in view of printout 1. Claim 23 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Singh in view of U.S. Pat. No. 5,414,922 (Korb). In view of the amendments and comments herein as well as additional reasons, these rejections are respectfully traversed.


Applicants note that claims 7, 10 – 12 and 23 are now dependant from independent claims placed in condition for allowance. Applicants respectfully assert that claims 7, 10 – 12 and 23 are therefore in condition for allowance.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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AMENDMENTS TO THE DRAWINGS

The attached "Replacement Sheet" of drawings include changes to Figure 1. The attached "Replacement Sheet," which includes Figures 1 and 2, replaces the original sheet including Figures 1 and 2.

Attachment: Replacement Sheet